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NOTES ON CERATOPOGONIDAE (DIPTERA)

By Dr. J. W. S. Macfie, F.R.E.S.

The types of the new species of insects described below are in the British Museum.

The unit of measurement used is about 3·7 μ.

1. A new species of *Dasyhelea* from Hawaii.

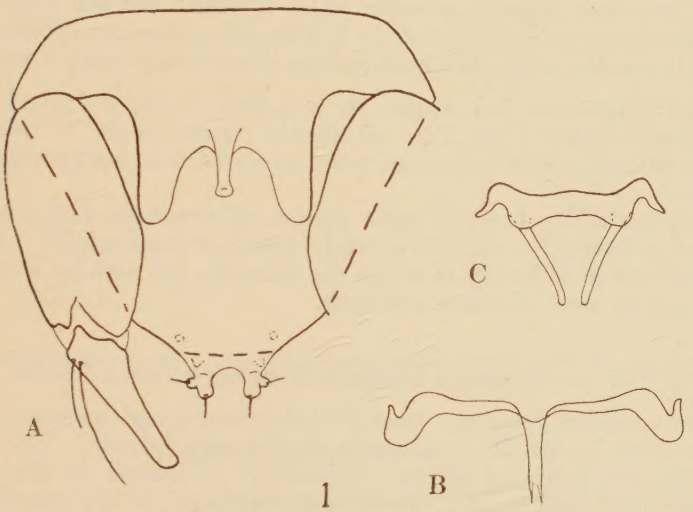


Fig. 1.—*Dasyhelea calvescens* sp. n.—hypopygium of male, ventral view; A. 9th segment and clasper; B. harpes; C. aedeagus.

Dasyhelea calvescens sp. n.

A small, very dark brown or blackish species, with wings almost entirely devoid of macrotrichia, scutellum very dark brown, halteres with white knobs, and femora and tibiae dark brown.

♂♀. Length of wing, 0·8–1·0 mm., greatest breadth, 0·3–0·4 mm.

Head very dark brown, blackish. Eyes densely hairy. Palpi darkish brown: segment 3 sub-cylindrical, without pit; lengths of last three segments about 9, 7, and 9 units in male, and 12, 8, and 10 units in female respectively. Antennae very dark brown, the segments sculptured. In male plume rather small, blackish; no segments binodose. Segments 4–12 forming an almost continuous series, measuring in one specimen from 7 by 8 to 7 by 4·5 units; the lengths and greatest widths of the last three segments in the same specimen about 8 by 5, 10 by 6, and 14 by 6 units respectively, the last without stylet. In female segments 4–14 forming an almost continuous series with little alteration of shape between 10 and 11, sub-spherical to oval, measuring in one specimen from 7 by 7 to 8 by 5 units, the last segment longer, about 14 units, tapering distally, without stylet. The combined lengths of segments 3–10, 4–10, and 11–15 about 61, 52, and 47 units respectively. *Thorax* almost uniformly blackish, with short stiff bristles also blackish. Scutellum very dark brown, but not so dark as scutum, and darker at sides than in middle; bearing two

lateral and four centro-marginal bristles, and sometimes one or two small hairs. *Wings* unadorned, but radial veins infuscated. Macrotrichia almost entirely lacking, only a very few at the extreme periphery near the tip, and sometimes one or two on *M*2. Costa reaching slightly beyond middle of wing. Radial cells not clearly defined : first obliterated; second longer than broad in female, almost square in male. Fork of *Cu* at about same level as middle of first radial cell. Halteres with white knobs. *Legs* brown, with femora, tibiae, and last segments of tarsi darker, dark brown. Form of segments normal. Claws equal, small, about one-third length of last tarsal segment in both sexes. T.R. in both sexes about 2·3. *Abdomen* very dark brown. Spermathecae two, very dark brown, oval, sub-equal, about 50 μ by 40 μ, the duct hardly at all chitinised. Hypopygium (fig. 1) very dark brown. Ninth tergite bearing posteriorly a pair of small processes which are chitinised and armed with short, stout bristles. Ninth sternite without bristles, produced posteriorly into three processes, a median which is conical, and two lateral. Harpes somewhat similar to those of *D. similis* C. I. & M., but median part apparently ending posteriorly in two fine points. Chitinised portions of aedeagus as shown in the figure.

Hawaii : Hanauma Bay, Oahu, 16–19.v.1936, 8 ♂♂, 1 ♀; and Waianae coast, Oahu, 5.vi.1936, 3 ♂♂, 1 ♀; all labelled " rocks by sea," " tidal rocks," or " beach or coast rocks," and some noted as reared from orange pupae (*F. X. Williams*).

This species differs from all other species of *Dasyhelea* with which I am acquainted in having the wings practically devoid of macrotrichia. It belongs to the small group of species in which the antennae are without a stylet, and (in the male) have no binodose segments.

2. Two new species of *Dasyhelea* from the Solomon Islands.

The two species of *Dasyhelea* described below were found in a small collection of midges made by Mr. R. A. Lever in the Solomon Islands. The collection included also the following species : *Styloconops albiventris* de Meij., 48 ♀♀; *Leptoconops* (sens. lat.) sp., 1 ♀; *Culicoides mollis* Edw., 27 ♀♀; and *Culicoides orientalis* Macfie, 4 ♀♀.

Dasyhelea atronotata sp. n.

A brown species with hyaline wings marked with one conspicuous dark brown spot about the middle of the anterior border, covering the second radial cell.

♀. Length of wing nearly 1·0 mm.; greatest breadth nearly 0·45 mm.

Head darkish brown. Eyes hairy. Palpi very pale brown, third segment sub-cylindrical, without a definite pit : lengths of last three segments about 15, 6, and 9 units respectively. Antennae rather pale brown, torus pale brown, but terminal segments of flagellum a little darker. Segments finely sculptured. Segments 4–10 from about 11 by 8 to 9 by 7 units; 11–14 sub-equal, 10–11 by 7 units; 15 longer, about 22 by 7 units, without stylet. The combined lengths of segments 3–10, 4–10, and 11–15 about 79, 66, and 65 units respectively. *Thorax* darkish brown, scutum mottled with darker patches. Scutellum paler, yellowish-brown, bearing 5 bristles but no small hairs. *Wings* clear, colourless, with one conspicuous dark brown spot about middle of anterior border which is square and covers second radial cell and veins enclosing it. Macrotrichia rather scanty, quite colourless and so almost invisible. Costa extending about half length of wing. First radial cell obliterated; second small, square. Fork of *Cu* at about same level as base of second radial cell. Halteres colourless. *Legs* pale brown, femora and tibiae each with a narrow darker

band about the middle. Knees dark. T.R. about 2. Fourth tarsal segments short but not cordiform. Claws small, equal. *Abdomen* rather pale brown; tergites 3 to 7 each with a dark brown oblong area near base on each side of middle line, 8 entirely dark brown. Spermatheca single, very dark brown, oval or obovate, about 40 μ by 30 μ; the duct chitinised for a short distance, about 4 μ.

SOLOMON ISLANDS: Tulagi, 14.ii.1935, 1 ♀ (*R. A. Lever*).

This insect resembles closely *Thysanognathus monostictus* I. & M. (which perhaps should be regarded as a *Dasyhelea*), a species taken in Zanzibar; the two are indeed so similar that they may prove to be the same notwithstanding the great distance apart of the localities in which they occur.

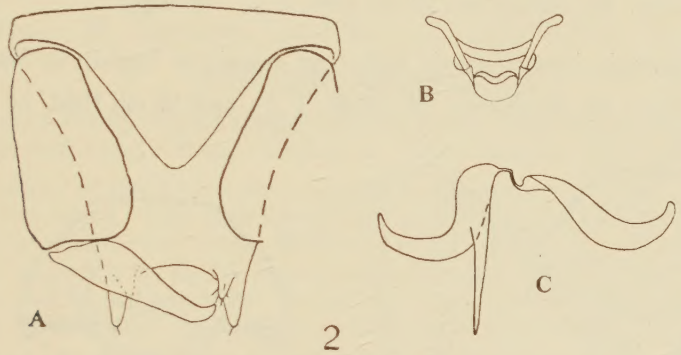


FIG. 2.—*Dasyhelea humilis* sp. n.—hypopygium of male, ventral view; A. 9th segment and clasper; B. aedeagus; C. harpes.

Dasyhelea humilis sp. n.

A small, darkish brown species without any very distinctive feature, with the second radial cell longer than broad, and characteristic hypopygium.

♂♀. Length of wing about 0·8 mm., greatest breadth about 0·26 mm.

Head dark brown. Eyes hairy. Palpi almost colourless, third segment cylindrical, without pit: lengths of last three segments in both sexes about 12, 6, and 8 units respectively. Antennae dark brown, segments sculptured. In male, plume dark brown: segments 4–11 ranging from about 10 by 9 to 10 by 4–5 units; 12–14 binodose, sub-equal, 18–22 by 4–5 units; 15 about 16 by 4–5 units, without stylet. In female, segments 4–10 slightly narrowed anteriorly, from about 7 by 7 to 10 by 4–5 units; 11–14 slightly longer, sub-equal, about 11–12 by 4–5 units; 15 about 14 by 4 units, without stylet. The combined lengths of segments 3–10, 4–10, and 11–15 about 71, 63, and 60 units respectively. *Thorax* yellowish-brown with broad dark brown stripes in the usual situations. Scutellum paler, yellowish, bearing 5–6 bristles but no small hairs. *Wings* unadorned. Macrotrichia fairly numerous. Bare areas along the veins distinct. Costa reaching about middle of wing. First radial cell obliterated, second longer than broad in both sexes. Fork of *Cu* proximal to level of end of costa in female, distal in male. Halteres almost colourless. *Legs* pale brown, femora darker than other segments, without distinct bands. T.R. about 2, rather more in female, rather less in male. *Abdomen* darkish brown, not very dark. Spermatheca single, well chitinised, pyriform, about 48 μ by 37 μ. Components of hypopygium appearing in ventral view as shown in the figures (fig. 2).

SOLOMON ISLANDS: Tulagi, 14.ii.1935, 2 ♂♂, 1 ♀ (*R. A. Lever*).

3. Additional Ceratopogonidae from Trinidad and Grenada.

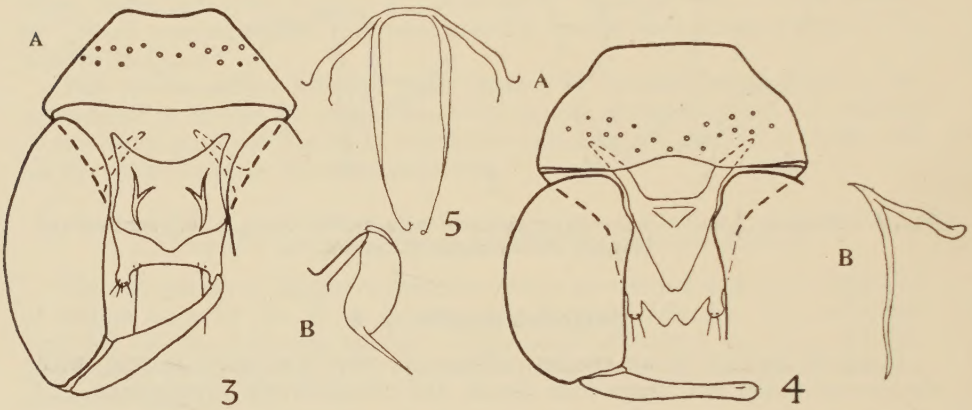
This collection consists of 72 specimens from Trinidad collected by Mr. A. M. Adamson, and 24 from Grenada collected by Mr. C. Munro. The Trinidad specimens belong to fifteen different species, seven of which appear to be new and are therefore described here. The new species I have named after persons prominent in the history of the colony. All the specimens from Grenada are *Culicoides paraensis* (Goeldi).

Forcipomyia ingrami Carter.

Trinidad: St. Augustine, 29.viii.1936, 1 ♂, "At light."

Forcipomyia inornatipennis Aust. var *ornaticrus* Ingram & Macfie.

Trinidad: St. Augustine, 30.v.1936, 1 ♂; and 29.viii.1936, 14 ♀♀, "At light."



Figs. 3–5.—Fig. 3. *Forcipomyia raleighi* sp. n.—hypopygium of male, ventral view.—A. 9th segment and aedeagus; B. harpe. Fig. 4. *Forcipomyia abercrombyi* sp. n.—hypopygium of male, ventral view—A. 9th segment and aedeagus; B. harpe. Fig. 5. *Forcipomyia pictoni* sp. n.—ventral view of harpes.

Forcipomyia raleighi sp. n.

A brown species with a banded abdomen, bearing scales as well as bristles and hairs. Wings unadorned. Hind legs with a dark brown band on each side of the knee. T.R. about 0·5.

♂♀. Length of wing about 1·5 mm.; greatest breadth about 0·4 mm. in male, 0·5 mm. in female.

Head brown. Palpi darker; basal half of third segment inflated, with a deep pit: length of third segment as great or greater than combined lengths of two terminal segments. Antennae brown. In male plume darkish brown, and terminal segments paler than the rest. Segments 4–11 successively narrower, from about 12 by 14 to 13 by 8 units; 12–15 more elongate, about 40, 35, 31, and 35 (including stylet of about 5 units) units respectively in one specimen. In female last five segments darker than rest: segments 4–10 somewhat flask-shaped, from about 13 by 12 to 14 by 9 units; 11–14 more elongate, sub-equal, about 17 by 8 units; 15 about 26 (including stylet of about 4 units) by 9 units. The combined lengths of segments 3–10, 4–10, and 11–15 about 113, 99, and 95 units respectively.

Thorax brown, with darker brown markings. Scutellum dark brown, bearing fairly numerous bristles and hairs. *Wings* unadorned, bearing scales as well as bristles and hairs. Venation normal. First radial cell obsolete, second well formed. Fork of *Cu* at about same level as end of costa in both sexes. Halteres with brown knobs. *Legs* rather pale brown, bearing scales as well as bristles and hairs. Knees pale. Hind legs with a dark brown band on each side of knee. No modified bristles. T.R. about 0·5 in both sexes. *Abdomen* with proximal segments banded; bearing scales as well as bristles and hairs. The banding of the abdomen is most notable in the male, the scales most numerous in the female. Spermathecae two, well chitinised, sub-equal, oval to sub-spherical, about 55 μ to 60 μ by 45 μ to 56 μ; the duct chitinised for only a short distance, about 3 μ to 4 μ. Hypopygium dark brown, the component parts in ventral view appearing as shown in the figures (fig. 3).

TRINIDAD: St. Augustine, 30.v.1936, 1 ♂; and 8.vi.1936, 11 ♂♂, 3 ♀♀.

Forcipomyia abercrombyi sp. n.

A darkish brown, rather shaggy-looking, species bearing scales in addition to bristles and hairs. Wings unadorned. Legs banded. T.R. about 1.

♂♀. Length of wing 1·1–1·5 mm.; greatest breadth about 0·4–0·5 mm.

Head dark brown. Palpi dark brown, but with inter-segmental joints pale brown, third segment inflated about middle, with a shallow pit: lengths of last three segments in one female about 23, 10, and 11 units respectively. Antennae rather pale brown. In male plume dark brown, paler at tip: segments 4–11 in one specimen measuring from about 13 by 13 to 15 by 10 units; 12–14 in same specimen about 40, 32, and 23 units respectively; and 15 about 26 (including stylet of about 4 units) by 6 units. In female segments 4–10 flask-shaped, measuring in one specimen from 17 by 11 to 16 by 9 units; 11–14 longer, sub-equal, in same specimen about 19–20 by 8 units; 15 about 26 (including stylet of about 3 units) by 7 units. The combined lengths of segments 3–10, 4–10, and 11–15 about 136, 116, and 105 units respectively. *Thorax* dark brown with traces of usual adornment; the sides not so dark as scutum, more yellowish. Scutellum very dark brown, bearing numerous bristles and hairs. *Wings* unadorned, bearing dark scales. Venation normal. Costa extending about half length of wing. First radial cell obliterated, second well formed. Petiole of *M* rather long. Fork of *Cu* at about same level as base of second radial cell. Halteres with pale knobs. *Legs* banded, with abundant scales. Knees pale. Hind legs with femora all darkish brown excepting at knee, tibiae with two dark brown bands, the one just beyond the knee, the other a little before the distal end, tarsal segments 1 to 4 dark brown excepting at joints, 5 entirely pale. Form of segments and claws normal. T.R. about 1. *Abdomen* darkish yellow-brown, with abundant dark scales. In female posterior extremity very dark, and strengthened to bear tufts of strong bristles. Cerci very dark brown. Spermathecae two, well chitinised, oval to sub-spherical, sub-equal, about 60 μ by 42–56 μ; hardly any part of the duct chitinised. Hypopygial structures as seen in ventral view as shown in the figures (fig. 4). Side pieces very strong, dark brown at apex, paler at base, bearing very strong bristles; claspers relatively small, yellowish in middle, darker at ends.

TRINIDAD: St. Augustine, 30.v.1936, 1 ♀; 8.vi.1936, 1 ♂, 3 ♀♀, "At light"; and 29.viii.1936, 1 ♀, "At light."

Forcipomyia pictoni sp. n.

A small, rather light-coloured, species bearing scales as well as bristles and hairs. Wings unadorned. Hind legs with a single, narrow, dark brown band on femora: T.R. about 0·5.

♂. Length of wing about 0·9 mm., greatest breadth nearly 0·3 mm.

Head dark brown. Palpi dark brown at base, but with last two segments pale brown, third segment inflated at base, with a deep pit: lengths of last three segments about 19, 8, and 10 units respectively. Antennae with torus dark brown, flagellar segments pale brown, and plume pale, yellowish: segments 4–11 measuring from about 11 by 11 to 8 by 7 units, 12–14 about 23, 26, and 19 units respectively, and 15 about 24 (including stylet of about 3 units) by 6 units. *Thorax* dorsally very dark brown, sides lighter, yellowish-brown. Scutellum very dark brown, bearing fairly numerous bristles and hairs. *Wings* unadorned, bearing scales. Costa hardly reaching middle of wing. First radial cell obliterated, short; second open but small. Fork of *Cu* distal to level of end of costa. Halteres with colourless knobs. *Legs* pale, yellowish, bearing scales as well as bristles and hairs. Four posterior femora each with a single narrow dark brown band (which may be incomplete) a little before apex. Knees pale. Tibiae unadorned, but with infuscation at the bases of a few exceptionally strong bristles. Tarsal segments pale brown. Form of segments and claws normal. T.R. about 0·5. *Abdomen* pale brown, tergites each with a narrow dark brown band near base; bearing scales as well as bristles and hairs. Hypopygium parti-coloured, distal end of ninth segment and of side pieces dark brown, the rest paler, yellowish. Ninth segment of usual form; sternite not excavated in middle line posteriorly, bearing numerous bristles. Side pieces long and narrow. Claspers slender, with double curve. Harpes (fig. 5) united at base; long rods with filiform, coiled, ends. Aedeagus delicate and difficult to distinguish, apparently of the usual form. Membrane joining aedeagus to ninth sternite not spiculate.

TRINIDAD: St. Augustine, 8.vi.1936, 1 ♂, "At light."

Atrichopogon adamsoni Macfie.

TRINIDAD: St. Augustine, 30.v.1936, 1 ♀; and 29.viii.1936, 2 ♀♀, "At light."

Atrichopogon glaber Macfie.

TRINIDAD: St. Augustine, 29.viii.1936, 2 ♂♂, 3 ♀♀, "At light."

The male, which has not previously been collected, resembles the female excepting in the following particulars.

Antennae with last three and a half segments dark brown: segments 4–11 measuring in one specimen from 11 by 10 to 10 by 7 units; 12–14 about 16, 23, and 20 by 5–6 units; and 15 about 30 (including stylet of 5 units) by 7 units. Scutellum bearing 4 bristles, and one or two small hairs. T.R. rather less, about 2·3. Hypopygium in ventral view as shown in the figure (fig. 6).

In the females, although the wings are practically without macrotrichia, there may be one or two at the extreme periphery at the tip, and the curved processes on the posterior margin of the seventh sternite may have two or three branches.

Atrichopogon insigniventris Macfie.

TRINIDAD: St. Augustine, 29.viii.1936, 1 ♀, "At light."

Atrichopogon woodfordi sp. n.

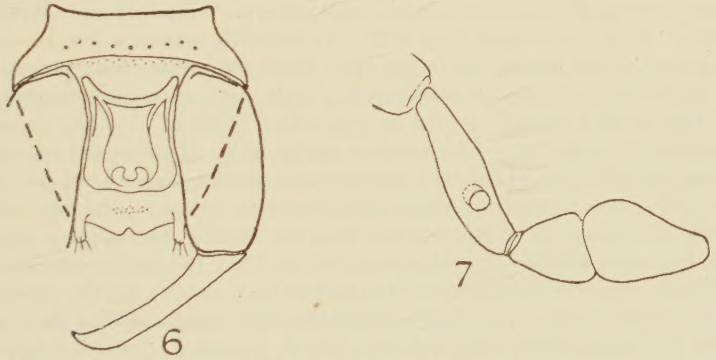
A rather dark yellowish-brown species with fairly numerous macrotrichia on the wings, the first radial cell not open, the abdomen unarmed, and the T.R. about 2.

♀. Length of wing about 1·1 mm., greatest breadth about 0·4 mm.

Head dark brown. Eyes hairy in part at least. Palpi dark brown, third segment inflated about middle, with a deep pit: lengths of last three segments about 13, 9, and 10 units respectively, the last broad at base and rather pointed at tip. Antennae very dark brown: segments 4–10 from sub-spherical to oval, measuring in one specimen from 8 by 8 to 10 by 6 units; 11–14 elongate, sub-equal, in the same specimen about 20–22 by 6 units; 15 about 33 (including long stylet of about 7 units) by 5 units. The combined lengths of segments 3–10, 4–10, and 11–15 about 72, 61, and 117 units respectively. *Thorax* dark yellowish-brown, with darker brown scutal adornment of usual pattern. Scutellum slightly paler than scutum, bearing four dark bristles, and one or two small hairs. *Wings* unadorned, but brownish. Macrotrichia fairly numerous at tip, but only a very few between branches of *Cu*, and none, or only one or so, in anal cell. Costa extending a little more than two-thirds length of wing. First radial cell almost obliterated, represented by a line; second long and narrow. Petiole of *M* hardly as long as cross-vein. Fork of *Cu* distal to that of *M*, at about same level as distal part of first radial cell. Angle formed by branches of *Cu* much less than a right angle. Halteres with pale brown knobs. *Legs* almost uniformly yellowish-brown, rather dark, with terminal tarsal segments infuscated. T.R. only about 2. Form of segments, claws, and empodium normal. *Abdomen* not so dark as scutum, unarmed. Spermatheca single, highly chitinised excepting at base, pyriform, total length about 92 μ, and greatest breadth about 62 μ.

Trinidad: St. Augustine, 29.viii.1936, 2 ♀♀, "At light."

This species resembles in some respects *A. flumineus* Macfie, but is smaller, has fewer macrotrichia on the wings, and has the first radial cell practically obliterated.



Figs. 6–7.—Fig. 6. *Atrichopogon glaber* Macfie, hypopygium of male, ventral view. Fig. 7. *Atrichopogon gordoni* sp. n., palp of female.

Atrichopogon harrisi sp. n.

A very dark brown or blackish species resembling in structural characters *A. glaber* Macfie, but differing as indicated below.

♀. Length of wing about 1·0 mm., greatest breadth about 0·4 mm.

Head blackish. Eyes hairy. Palpi very dark brown, similar to those of *A. glaber*, third segment with a deep pit. Antennae very dark brown, torus as dark as the rest: segments 4–10 from slightly flattened to oval, measuring in the unique specimen from about 6 by 8 to 8 by 7 units; 11–14 elongate, successively longer, from 16 by 7 to 22 by 7 units; 15 about 29 (including pointed stylet of about 5 units) by 6 units. The combined lengths of segments 3–10, 4–10, and 11–15 about 58, 48, and 107 units respectively. *Thorax* blackish. Scutellum blackish. *Wings* unadorned, brownish. Macrotrichia scanty, a few at tip in

cells *R*5 and *M*1. Both radial cells well formed, the second over three times as long as the first. Petiole of *M* about same length as cross-vein. Fork of *Cu* distal to that of *M*. Angle formed by branches of *Cu* much less than a right angle. Halteres with dark brown knobs. *Legs* dark brown. T.R. about 2·6. Form of segments, claws, and empodium normal. *Abdomen* blackish, the cerci a little paler. Spermatheca single, highly chitinised, pyriform, total length about 89 μ, and greatest breadth about 56 μ. Ventral armature similar to that of *A. glaber*, but in the unique specimen the median process on the posterior border of the seventh sternite is very dark brown, and is composed of a stout common stem from which arise three short, irregular, processes.

TRINIDAD : St. Augustine, 29.viii.1936, 1 ♀, " At light."

Atrichopogon gordoni sp. n.

A rather dark yellowish-brown species with few macrotrichia on the wings, the first radial cell almost obliterated, the abdomen armed, and the T.R. about 2·3.

♀. Length of wing about 1·3 mm., greatest breadth about 0·46 mm.

Head dark brown. Eyes hairy in part at least. Palpi (fig. 7) very dark brown, third segment rather slender, sub-cylindrical, with a small pit, last two segments broader, together forming an oat-shaped body; lengths of last three segments about 18, 8, and 12 units respectively. Antennae very dark brown, torus as dark as the rest : segments 4–10 from sub-spherical to oval, measuring in the unique specimen from 10 by 10 to 9 by 8 units; 11–14 elongate, successively longer, from 23 to 27 units; 15 about 39 units including the pointed stylet of about 8 units. The combined lengths of segments 3–10, 4–10, and 11–15 about 76, 64, and 140 units respectively. *Thorax* dark yellowish-brown, with darker brown markings on scutum forming usual pattern. Scutellum paler brown, bearing four bristles. *Wings* unadorned, brownish. Macrotrichia scanty, a few in cell *R*5, and none elsewhere, or just one or two in cell *M*1. Costa extending about two-thirds length of wing. First radial cell almost obliterated, a mere line; second well formed, long and narrow. Petiole of *M* hardly as long as cross-vein. Fork of *Cu* distal to that of *M*. Angle formed by branches of *Cu* much less than a right angle. Halteres with brownish knobs. *Legs* almost uniformly yellowish-brown, but terminal tarsal segments somewhat infuscated. T.R. about 2·3 Form of segments, claws, and empodium normal. *Abdomen* a dull brown, not so dark as scutum, the dorsum darker than the venter. Spermatheca single, highly chitinised, large, sub-spherical or oval, about 100 μ by 81 μ; the duct narrow and chitinised for about 11 μ. Armature somewhat similar to that in *A. glaber*. On the posterior margin of the seventh sternite is a pale brown, tassel-like, tuft composed of a short stem from which arise two groups each of three long, pointed, processes. Immediately posterior to this tuft is a group of long finger-like processes; and on each side a small triangular, tooth-like, chitinised projection, and three bristles.

TRINIDAD : St. Augustine, 29.viii.1936, 1 ♀, " At light."

Culicoides debilipalpis Lutz.

TRINIDAD : Near Tetron Bay, 16.v.1936, 1 ♀.

Culicoides guttatus Coq.

TRINIDAD : St. Augustine, 6.xi.1934, 1 ♀, " At light," and 29.viii.1936, 4 ♀♀, " At light " ; and Nariva Ferry, 5.vii.1936, 1 ♀.

Culicoides paraensis Goeldi.

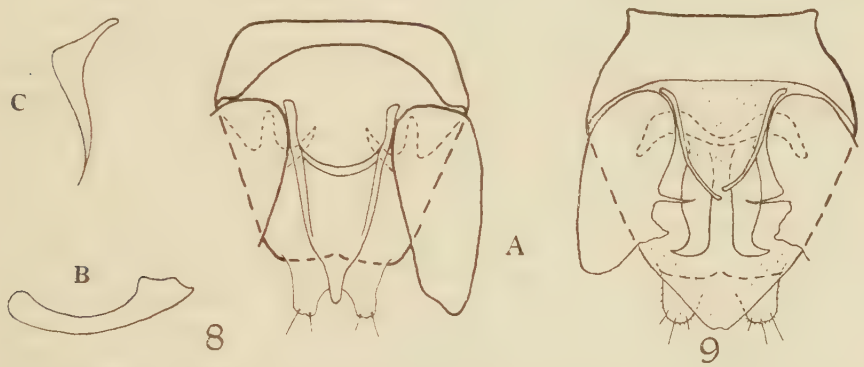
GRENADA : St. Andrew's, 14.ix.1937, 24 ♀♀ (*C. Munro*).

Culicoides stellifer Coq.

Trinidad: St. Joseph, 14.v.1936, 3 ♀♀.

Culicoides pusillus Lutz.

A very small species with the head and thorax very dark brown, and the abdomen and legs paler brown. Wings with a small dark area in the middle of the anterior border, and a few quite ill-defined pale areas in the usual situations. Macrotrichia almost entirely absent.



Figs. 8–9.—Fig. 8. *Culicoides pusillus* Lutz, hypopygium of male, ventral view—A. 9th segment and aedeagus; B. clasper; C. harpe. Fig. 9. *Stilobezzia chaconi* sp. n., hypopygium of male, ventral view.

♂, ♀. Length of wing about 0·8–0·9 mm., greatest breadth about 0·3 mm.

Head very dark brown. Eyes separated above in both sexes, more widely in male than in female. Palpi almost colourless, third segment slightly inflated, with a shallow pit; lengths of last three segments about 10, 7, and 6 units respectively. Antennae pale brown. In male plume brown: last three segments elongate, in one specimen measuring 22, 16, and 21 by 4–5 units respectively. In female segments 4–10 from sub-spherical to oval, in one specimen measuring from 5 by 5 to 7 by 4 units; 11–14 sub-equal, about 10–11 by 4 units; 15 about 16 by 4–5 units. The combined lengths of segments 3–10, 4–10, and 11–15 about 50, 42, and 58 units respectively. *Thorax* very dark brown. Adornment (if any) not visible in the specimens examined which had been preserved in spirit. Scutellum very dark brown, bearing 3 bristles, but no small hairs. *Wings* pale, with a single conspicuous dark spot covering second radial cell and distal part of first. Pale areas very ill defined, as shown in Lutz' (1913) excellent figure. Macrotrichia almost wanting: in male, none; in female, a very few near periphery at tip. Venation normal; both radial cells formed. Halteres with almost colourless knobs. *Legs* pale brown, knees dark. Form of segments and claws normal; fourth tarsal segments not cordiform. T.R. about 1·8. *Abdomen* brown, much paler than thorax. In female cerci pale; in male hypopygium dark brown. Spermathecae two, well chitinised, oval, sub-equal, about 40 μ by 30 μ; the duct chitinised for a short distance, 3–4 μ. Hypopygium appearing in ventral view as shown in the figures (fig. 8). The claspers are pale, yellowish. The membrane joining the aedeagus to the ninth tergite is not spiculate.

Trinidad: St. Augustine, 29.viii.1936, 5 ♂♂, 4 ♀♀, "At light."

This species is briefly redescribed because so far as I can ascertain it has not been recorded since it was named by Lutz in 1913, and the original

description lacks certain details (*e.g.* those of the hypopygium) now necessary for identification.

Stilobezzia chaconi sp. n.

A very dark brown or blackish species with the scutellum blackish, bearing three bristles, the first tarsal segments of the hind legs without a basal spine, and the wings unadorned and without macrotrichia.

♂. Length of wing nearly 1·7 mm., greatest breadth about 0·45 mm.

Head very dark brown. Palpi very dark brown, third segment subcylindrical, without definite pit: lengths of last four segments about 18, 19, 12, and 18 units respectively. Antennae very dark brown, plume large and dark: segments 4–11 measuring from about 15 by 11 to 17 by 7 units; 12 about 21 by 7 units; 13 and 14 much elongated, about 55 units; and 15 still longer, about 75 by 4 units. *Thorax* blackish. Scutellum blackish, bearing two lateral and one centro-marginal bristle, but no small hairs. *Wings* unadorned, of usual form, without macrotrichia. Costa extending rather more than two-thirds length of wing. First radial cell narrow; second much wider, and nearly four times as long as first. Cross-vein and distal portion of *R*1 not in line. Petiole of *M* long, over three times as long as cross-vein. Fork of *Cu* a little proximal to level of fork of *M*. Halteres with darkish brown knobs. *Legs.* Femora on four posterior legs entirely very dark brown, on fore legs paler brown. Tibiae on middle and hind legs entirely very dark brown, on fore legs pale brown in middle and slightly darker at ends. Tarsal segments on all legs almost colourless, but fourth and fifth somewhat infuscated. First tarsal segment of hind legs without a basal spine. Form of segments and claws normal. T.R. about 2. *Abdomen* very dark brown above, venter rather paler. Hypopygium in ventral view appearing as shown in the figure (fig. 9). The harpes with hook-like ends which are infuscated.

Trinidad: St. Augustine, 29.viii.1936, 1 ♂, "At light."

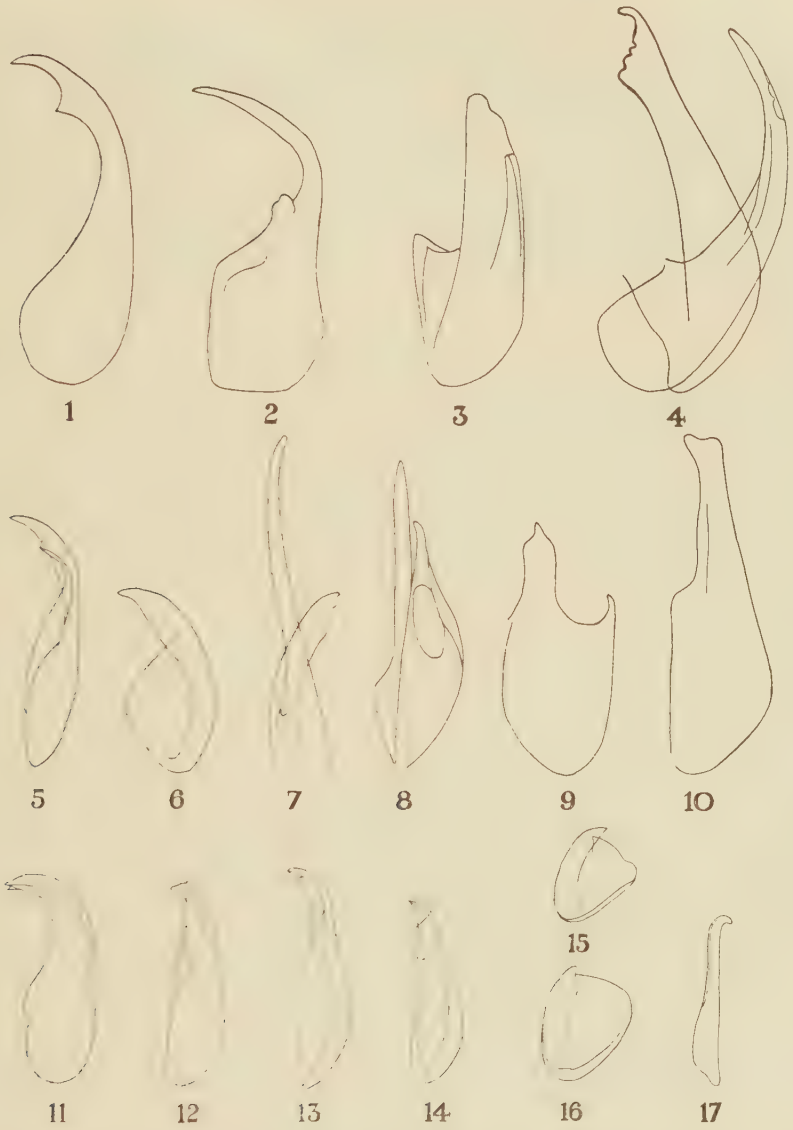
A REVISION OF THE MALAYAN SPECIES OF *PRATAPA* MOORE (LEPIDOPTERA–LYCAENIDAE) *

By A. Steven Corbet, F.R.E.S.

The genus *Pratapa* Mre. was revised by Fruhstorfer (1911, *Berlin. ent.* Z., **56**: 197–272) in an important paper dealing with the Indo-Australian Theclinae and Poritiinae. This revision formed the basis of the monograph by Seitz (1926, *Grossschmett. Erde*, **9**: 970–972), in which all the important forms are accurately figured. The Indian species were dealt with by Evans (1932, *Ident. Ind. Butt.*: 279–281), whose key has been adapted in the present paper to fit the Malaysian species, and the Javanese species were considered by Piepers and Snellen (1918, *Rhop. Java*: 91–95).

With the exception of *P. vidura*, which is local on the forested hills and foothills, all the *Pratapa* species are rare in Malaysia and, with many subspecies, the females are unknown. The Malaysian representatives of the *Pratapa* species differ from the more northerly races in the much more extensive orange subtornal patch on the hind-wing beneath but, as a rule, the Malayan, Sumatran, Bornean and Javanese forms of any one species show little geographical differentiation.

* Although I have altered certain adjectival trivial names to agree with the gender of the generic name in accordance with Article 14 of the International rules of zoological nomenclature, I am of the opinion that Article 19 should be adhered to rigidly so that the original spelling may be preserved in all cases.



Figs. 1–17.—Male clasper of (1) *Pratapa penicilligera* (Nic.) (Assam); (2) *P. penicilligera* (Nic.) (Burma, Dawnas); (3) *P. cotys* (Hew.) (Assam); (4) *P. sannio* Drc. (Borneo) holotype; (5) *P. burmana* (Mre.) (Pulau Langkawi); (6) *P. vidura sinhara* (Fruh.) (Malaya); (7) *P. ctesia ctesia* (Hew.) (Malaya); (8) *P. blanka blanka* (Nic.) (Malaya); (9) *P. cremana* Nic. (Java); (10) *P. capusa* (Fruh.) (Nias) holotype; (11) *P. lowii* (Drc.) (Borneo) holotype; (12) *P. deva stella* subsp. n. (Malaya); (13) *P. icetas extensa* Evans (Burma); (14) *P. icetoides carmentalis* (Nic.) (Assam); (15) *P. cleobis cleobis* (Godt.) (Assam); (16) *P. queda* sp. n. (Malaya) holotype; (17) *P. anysis* (Hew.) (Celebes) holotype. In the case of Fig. 4 both claspers are shown.

Examination of the male genitalia.

In the genus under consideration, the male genitalia usually differ considerably from one species to another, while certain species in the *P. cotys* group, which would be considered as the Burmese, Bornean and Javanese races of a single collective species on the basis of the similarity in fascies, show such remarkable differences in genitalia that they must be regarded as specifically distinct. In the case of *P. penicilligera* (Nic.), the male clasper shows an unusual transformation within a somewhat restricted zoo-geographical area : on the other hand, the species *P. anysis* (Hew.) and *P. anysides* (Röb.), which differ only in secondary sexual characters, have identical genitalia, and the case of *P. cleobis* (Godt.) and *P. queda* sp. n. is somewhat analogous.

Pratapa Mre.

Pratapa Moore, 1881, *Lep. Ceylon*, **1** : 108. Type = *Amblypodia deva* Mre., 1857.
Camena Hewitson, 1865, *Ill. diurn. Lep.* : 47. Type = *Camena ctesia* Hew., 1865. Preoccupied by *Camaena* Baly, 1862, in Coleoptera.
Dacalana Moore, 1884, *J. asiat. Soc. Bengal*, **53** : 36. Type = *Amblypodia vidura* Hsf., 1829.
Arrhenothrix de Nicéville, 1890, *Butt. Ind. Burmah, Ceylon*, **3** : 336. Type = *Arrhenothrix penicilligera* Nic., 1890.

Eyes smooth; palpi smooth; antennal club gradual and cylindrical. Fore-wing with veins 5 and 6 well separated at their origins. Hind-wing with approximately equal tails at veins 1b and 2. Male with a brand on the upperside of the hind-wing near the origin of vein 7. Both sexes blue or greenish-blue above and without a white subtornal area on the hind-wing.

Differs from the closely allied genus *Tajuria* Mre. (with type *Hesperia longinus* F., 1798), in the possession of the hind-wing brand and in the area of specialised scales, bearing one or more hair tufts, below the median on the fore-wing beneath.

Some authors separate species of the *P. vidura*, *P. cotys* and *P. lowii* groups as *Dacalana*. It is difficult to justify this procedure, for the male genitalia show *P. lowii* and the *P. vidura* group (both with a hair tuft on the upperside of the fore-wing) to be closely allied, while a separation on the basis of the white median line on the hind-wing beneath would unite the *P. cotys* and *P. vidura* groups and separate them from *P. lowii*.

The presence or absence of vein 9 on the fore-wing is a variable character and cannot be used to separate *P. vidura* and *P. penicilligera*.

Key for the separation of the Malaysian species of Pratapa.

1 (8). Un with white median band.
2 (7). ♂ upF with a prominent brand.

vidura group.

3 (4). Un discal line composed of curved streaks . . . . . *burmana*.
4. Un discal line composed of straight, contiguous streaks.
5 (6). UnH discal line in spaces 6 and 7 not outwardly shaded with white : orange subtornal area broad and prominent . . . . . *vidura*.
6. UnH discal line outwardly shaded with white in spaces 6 and 7 : orange subtornal area narrow and obscure . . . . . *penicilligera*.
7. ♂ upF without a brand.

cotys group.

8. Un without a white median band.
9(11). ♂ upF with a prominent brand.

lowii group.

10. Un narrow, dark discal line as in *vidura* group . . . . . *lowii.*
11. ♂ upF without a brand.
12(15). 3rd joint of palpi long and in line with 2nd joint. F veins 5 and 6 approximate at their origins.

ctesia group.

13(14). Un with discal series of separate dark streaks and broad cell-end bars *ctesia.*
14. Un with dark narrow discal line, on F faint in ♂ and obsolete in ♀: no cell-end bars . . . . . *blanka.*
15. 3rd joint palpi short and bent down at an angle with 2nd joint. F veins 5 and 6 separate at their origins.
16(24). ♂ unF with a single tuft of long hairs.
17(22). UnF discal line not nearer cell-end than termen.

deva group.

18(19). UnF discal line composed of separate commas. ♂ unF tuft black . *deva.*
19. UnF discal line composed of straight, contiguous streaks.
20(21). Un uniform, pale greyish-brown. ♂ unF tuft yellow . . *icetoides.*
21. Un whitish-grey and not uniformly coloured. ♂ unF tuft black . *icetas.*
22. UnF discal line nearer cell-end than termen.

queda group.

23. Un greyish-brown, with rather sinuate discal line. ♂ unF tuft black *queda.*
24. ♂ unF with two hair tufts.

cleobis group.

25. UnF discal line nearer cell-end than termen. ♂ unF inner tuft long and black, outer tuft short and creamy-white . . . . . *cleobis*

1. *Pratapa burmana* (Mre.).

Dacalana burmana Moore, 1884, *J. asiat. Soc. Bengal*, **53** : 36; ♂, Moulmein.
Dacalana vidura burmana Seitz, 1926, *Grossschmett. Erde*, **9** : 970.
Dacalana vidura burmana Corbet and Pendlebury, 1934, *Butt. Malay Penin.*, pl. xiii, f. 189 ♂.

In the Malay Peninsula the species appears to be known only from Kedah and from Pulau Langkawi, off the coast of Kedah.

2. *Pratapa vidura sinhara* (Fruh.).

Amblypodia vidura Horsfield, 1829, *Cat. Lep. Mus. E. Ind. Co.* : 113, pl. i, f. 6, 6a ♂; Java.
Dacalana vidura sinhara Fruhstorfer, 1914, *Deuts. ent. Z.* "*Iris*," **27** : 175; ♂♀, North-east Sumatra.
Dacalana vidura sinhara Seitz, 1926, *Grossschmett. Erde*, **9** : 970.

P. vidura is a Malaysian species, extending northwards to South Burma. In both sexes, Malayan specimens resemble the Sumatran form. Other Malaysian races are *aziyada* (Fruh.), Borneo (Seitz, pl. 155 a 8 ♂ und.) and *baganda* (Fruh.), East Java (Seitz, pl. 155 a 6 ♂, 7 ♀ und.) : the nominotypical form from West Java is figured in Piepers and Snellen, f. 143 a ♂, b ♀.

P. penicilligera (Nic.) (Seitz, pl. 155 b 1 und., 2 ♂), described from the Khasi Hills in Assam, is a species quite distinct from *P. vidura*, which it closely resembles. de Nicéville's species is represented in the British Museum from Bhutan, Assam, Burma and North Siam : in examples from the first two localities the male clasper has a subterminal, lateral, triangular process which is absent from specimens from the two southern localities.

The *P. cotys* group.

Examination of the male genitalia has shown that *P. cotys* (Hew.) (Seitz, pl. 155 e 2 ♂, 3 und.), described from Nepal and of which *cotoides* (Tytler) may be a form, *P. sannio* H. H. Drc., Borneo (Seitz, pl. 156 a 8 und.), and *P. cremara* (Nic.), Java (Seitz, pl. 155 e 4 und. and P. & S., f. 144 ♂) are all distinct species, although the fascies suggest that they may be geographical representatives of one collective species. It is possible that *capusa* (Fruh.), Nias (Seitz, pl. 155 e 5 ♂) may be a strongly differentiated subspecies of *P. sannio* for, in these two, the upturned hairs on the dorsum on the hind-wing beneath in the male have the same colour as the greyish-brown ground, while in *P. cotys*, *P. cremara* and *P. anysis* (Hew.) they are black. The differences in the male genitalia of *P. sannio* and *P. capusa* are of degree rather than of kind and recall those found in the Bornean and Nias races of *Jamides zebra* (H. H. Drc.).

Toxopeus (1929, *Tijd. Ent.*, **72** : 224) placed *cremara* as a race of **P. anysis* (Hew.), (Seitz, pl. 155 e 6 ♂, 7 und.), but the differences in wing shape, upperside colouring and male genitalia are so profound that there can be no doubt of their specific distinctness.

de Nicéville and Martin (1895, *J. asiat. Soc. Bengal*, **64** : 473) recorded two males of *P. cotys* from Sumatra, but no forms of the *P. cotys* group are known to me from the Malay Peninsula or Sumatra, although it is almost certain that they must occur.

P. lowii (H. H. Drc.) (Seitz, pl. 156 a 7 ♂ und.) is known only from the unique holotype from Labuan. It differs from Bornean *P. vidura* in the more convex termen and less pointed apex of the fore-wing and in the more purple colour of the upperside : on the hind-wing beneath, the tornal half of the discal line is outwardly whitened and the black subtornal spot in space 2 is only narrowly fringed with orange.

3. *Pratapa ctesia ctesia* (Hew.).

Camena ctesia Hewitson, 1865, *Ill. diurn. Lep.* : 48, pl. xx, f. 1, 2 ♂; North India.
Camena ctesia ctesia Seitz, 1926, *Grossschmett. Erde*, **9** : 971, †pl. 155 d 2 ♂.

A rare species in Malaya, known only from altitudes of 3500 feet and above. The species is rather variable and a Malayan male in my collection hardly differs from males from Sikkim and Darjiling.

The Formosan subspecies is *cakravasti* (Fruh.) (Seitz, pl. 155 d 3 ♂, 4 und.).

4. *Pratapa blanka blanka* (Nic.).

Tajuria blanka de Nicéville, 1895, *J. asiat. Soc. Bengal*, **63** : 39, pl. iv, f. 4 ♀; North-east Sumatra.
Pratapa lucidus H. H. Druce, 1895, *Proc. zool. Soc.*, **1895** : 596, pl. xxxiii, f. 3 ♂; Labuan.
Camena lucida lucida Seitz, 1926, *Grossschmett. Erde*, **9** : 972, pl. 156 a 1 ♂.

Males of Sumatran *blanka* and Bornean *lucida* cannot be separated on the material in the British Museum, the blue dusting on the black subapical area of the fore-wing being rather variable. Females appear to be excessively rare in Malaysia.

* *Iolaus anysis* Hewitson, 1865, *Ill. diurn. Lep.* : 42, pl. xix, f. 17, 18 ♂; Celebes (Macassar). A British Museum male from Minahassa differs from the male type of *anysis* in lacking the black brand in the nacreous area on the upperside of the hind-wing, but the genitalia appear to be identical in both specimens. The Minahassa male may be referable to *P. anysides* (Röb.) (*Iolaus anysides* Röber, 1887, *Iris*, **1** : 194; ♂, East Celebes).

† The figure on pl. 155 d 1 representing the underside is incorrect.

The Malayan representative, which is rare in the forested plains and foothills, may differ, perhaps, from the nominotypical form in the rather more extensive orange tornal area on the hind-wing beneath.

Other Malaysian subspecies are *nacandra* (Fruh.), Java (Seitz, pl. 155 e 1 und. and P. & S., f. 149 ♂, 92 ♀) and *damara* (Fruh.), Palawan. The North Indian race *minturna* (Fruh.) (Seitz, pl. 155 d 6 ♂, 7 und.—rather poor) differs in the prominent discal line on the underside of the fore-wing, and South Indian *argentea* Auriv. (= *sudica* Evans) (Seitz, pl. 155 d 5 ♂) is another well-differentiated subspecies.

5. **Pratapa deva stella** subsp. n.

Amblypodia deva Moore, 1857, *in* Horsfield & Moore, *Cat. Lep. Mus. E. Ind. Co.*, **1** : 46; ♂♀, Canara. Figured in Seitz, pl. 155 b 9 ♂, c 1 ♀.

The Malayan representative constitutes a new subspecies.

♂. Nearest to Bornean *devana* H. H. Drc. ♂ (1895, *Proc. zool. Soc.*, **1895** : 597, pl. xxxiii, f. 4 and Seitz, pl. 155 c 3), but the upperside is deeper blue and, on the fore-wing, vein 1 is broadly blackened for about 1 mm. after entering the blue area. On the underside of the hind-wing, the orange area surrounding the black subtornal spot in space 2 is much broader, paler and yellower.

Wing expanse 33 mm.

Holotype. Malay Peninsula, Selangor, Bukit Kutu, 3300-3500 feet, 23.ix.1932 (*H. M. Pendlebury*) (Selangor Museum). Two males in my collection from the same locality.

Other *P. deva* subspecies are *angada* (Fruh.), North India (Seitz, pl. 155 c 2 ♂), *lila* Mre., Assam and Bengal, *cartena* (Fruh.), West Java (Seitz, pl. 155 c 6 ♂, 7 ♀, 8 und. and P. & S., f. 150 ♂), and *methara* (Fruh.), East Java : *devadatta* (Fruh.), South Borneo (Seitz, pl. 155 c 4 ♀), was described as a *deva* race but is not known to me.

6. *Pratapa icetoides calculis* H. H. Drc.

Camena icetoides Elwes, 1892, *Proc. zool. Soc.*, **1892** : 636, pl. xliv, f. 3 ♂; Karen Hills.
Pratapa calculis H. H. Druce, 1895, *Proc. zool. Soc.*, **1895** : 598, pl. xxxiii, f. 6 ♂, 7 ♀; Kina Balu.
Camena ister calculis Seitz, 1926, *Grossschmett. Erde*, **9** : 971, pl. 155 b 8 ♂.

A Malayan male of *P. icetoides* from Selangor (Klang Gates, 8.i.1924, *H. M. Pendlebury*) agrees exactly with a Bornean male in the British Museum, although this latter specimen lacks the prominent whitening of the outer edge of the discal line on the underside shown in Druce's original figures; Javanese *cretheus* (Nic.) also hardly differs.

Other *P. icetoides* races, placed under *ister* in Seitz, are *carmentalis* (Nic.), Assam, *cretheus* (Nic.), West Java and North-east Sumatra (Seitz, pl. 155 b 6 ♂, 7 ♀ and P. & S., f. 151 ♂), *ecphantus* (Fruh.), East Java (Seitz, pl. 155 b 5 ♂), and *yasa* (Fruh.), Nias.

All *P. icetoides* subspecies have the base of the costa on the fore-wing beneath tinged with yellow in both sexes and thus can be readily separated from the rather similar *P. icetas* (Hew.) (with subspecies *extensa* Evans and *mishmia* Evans), which is not yet known south of Burma.

7. **Pratapa queda** sp. n.

♂. In general appearance resembles typical *P. cleobis* (Godt.) ♂, from Assam, but is larger in size, the wings are longer, the fore-wing termen is more strongly convex and the apex more pointed.

Upperside.—Compared with *P. cleobis* ♂, the blue colour is paler, more powdery and has a greenish hue, and the hind-wing blackish-brown distal border is broader and inwardly irregular and diffuse; the hind-wing tails are longer, that at vein 1b broken in type but at least 5 mm. and that at vein 2 is 5 mm.

Underside.—The narrow, deep reddish-brown discal band is more maculate on the fore-wing consisting of a series of curved contiguous streaks and, on the hind-wing, it is very narrowly whitened only in the tornal half. The black, circular, subtornal spot (1 mm.) in space 2 and the larger black spot in the lobe lie in an extensive orange-yellow area which extends from the inner margin to space 4 and reaches the discal line in spaces 1b, 1c and 2.

The secondary sexual characters on the hind-wing above and on the fore-wing beneath as in *P. cleobis*, except that the nacreous area on the underside of the fore-wing has a single tuft of long black hairs. The male genitalia differs in no important respect from *P. cleobis*.

Wing expanse 38·5 mm.

Holotype. Malay Peninsula, Kedah, Kedah Peak, 3300–3900 feet, 25.iii.1928 (*H. M. Pendlebury*). In Selangor Museum. Recorded by Evans (1933, *J. F.M.S. Mus.*, **17** : 411) as *P. cleobis.*

Pratapa cleobis Godt.

Polyommatus cleobis Godart, 1823, *Encyc. Méth.*, **9** : 634; ♂♀, Bengal.
Tajuria cleobis Seitz, 1926, *Grossschmett. Erde*, **9** : 975, pl. 156 c 3 ♂.

The species has been recorded from Malaya by Evans (1933, *J. F.M.S. Mus.*, **17** : 411), but it appears that the specimens in question are referable to the previous species : I have seen no Malaysian specimens.

Of the *Pratapa* forms considered in this paper, the types of the following have been examined at the British Museum : *angada* Fruh., *anysis* Hew., *aziyada* Fruh., *baganda* Fruh., *burmana* Mre., *capusa* Fruh., *cartena* Fruh., *cotys* Hew., *damara* Fruh., *deva* Mre., *extensa* Evans, *lila* Mre., *lowii* H. H. Drc., *lucida* H. H. Drc., *minturna* Fruh., *mishmia* Evans, *nacandra* Fruh., *sannio* H. H. Drc., *sinhara* Fruh., *sudica* Evans, *vidura* Hsf. and *yasa* Fruh.

I am indebted to the Trustees of the British Museum (Natural History) for permission to study their collections, to Mr. H. M. Pendlebury, Director of Museums, F.M.S., for the loan of specimens, and to Brigadier W. H. Evans, C.S.I., C.I.E., D.S.O., for the gift of specimens from India and Burma.